REMARKS

This Application has been carefully reviewed in light of the Office Action mailed July 5, 2001. Claims 1- 150 were initially filed in this Application. Claims 104, 106-109, 115, 116, and 134-150 were previously cancelled, without prejudice or disclaimer, in response to a restriction requirement. Claims 1-103, 105, 110-114, 117-133 were pending in this Application prior to this Amendment and Response.

Applicants have, herein, cancelled Claims 6,18-23,26,51,63,89,110,130,131, and 133 without prejudice and disclaimer, and amended Claims 1-5,7,11,32,40,48-50,52,54,56,57,102,112,114,122,123,125,129, and 132. As such, Claims 1-5, 7-17,24-25,27-50,52-62,64-88,90-109,111-129, and 132 are now currently pending in this Application. Please note that the attached Exhibit 2 provides an edited version of the cancelled and amended Claims, and highlights all such amendments.

Applicants submit formal drawings of Figures 1-6 in the attached Exhibit A for the approval of the Examiner and the Official Draftsman.

OBJECTIONS AND REJECTIONS BASED ON 35 U.S.C. § 112

The Examiner objected to and rejected Claims 1-103, 105, 110-114 and 117-133 based on 35 U.S.C. § 112, ¶ 2 "as being indefinite." Applicants have done the following to overcome these objections and rejections:

- amended Claims 1 and 129 to ensure that the preambles are commensurate in scope with the claims by indicating that the plasma includes both positively charged depositant ions and electrons, which are negatively charged, and that the plasma is created as a result of the prior claim limitations, not just from the "mere heating of the depositant" as stated by the Examiner;

- amended Claims 1 and 129 to ensure that "the pressure" has proper antecedent basis;

- amended all relevant claims to remove any possible confusion over the use of the terms "a level" and "a rate" and to make it clear that gas is flowing through the vacuum chamber in relevant claims to assist with maintaining a designated pressure;

- amended claim references to "a voltage level" as indicated by the Examiner;

- amended claim references to "a power level" as indicated by the Examiner;

- cancelled Claims 18-23 and 26 to remove any potential confusion as alleged by the Examiner;

- amended Claims 32, 40, 48, 51, 112 and 114 to remove any potential confusion as alleged by the Examiner relating to such terms as "a desired location," "more even," and "more uniformly";

- amended Claim 40 to remove any reference to "location" and to remove any reference to "type" so that any alleged confusion was removed from Claims 40-47;

- amended Claim 48 to remove any reference to "position" so that any alleged confusion was removed from Claims 48-50, 53 and 55;

- amended Claims 49 and 50 to clarify any alleged confusion regarding weight;

- cancelled Claim 51 to avoid any alleged confusion with Claim 32;

- amended Claims 52, 54 to remove reference to "temperature," "prior plasma," "second plasma," and incorrect dependent reference;

- amended Claims 56 and 57 to specify frequency;

- cancelled Claim 63;

- cancelled Claim 89 based on the Examiner's statement that the term "'noble gas' represents the same set of elements as 'inert gas'";

- amended Claim 102 to correct typographical error;

Applicants respectfully traverse the Examiners rejection of Claims 34-39, 42-47, 53 and 55 based on the allegations of the Examiner that "the words 'base', 'transition' or 'working' is used before 'layer,' however no context in the claims provides these modifiers with any clear or necessary meaning." Applicants note that these terms are clearly defined in the Application in numerous locations throughout and are used in a manner that is clear and unambiguous by providing an added limitation that such layers serve and function as defined. Applicants respectfully aver that these claims comply with 35 U.S.C. § 112, ¶ 2.

Similarly, Applicants respectfully traverse the Examiners objection to Claims 36-39, 44-47, 53 and 55 based on the assertion by the Examiner that these claims are in "improper dependent form for failing to further limit the subject matter of a previous claim." The "layer" limitations are clearly defined and provide an added and distinguishing limitation to each of these claims. As such. Applicants respectfully assert that these claims are in proper form.

Applicants assert that the term "white metal clean" is clearly defined as well known to one of ordinary skill in the art and hence Claim 61 is not indefinite. Similarly, Applicants strongly contend that the "Steel Structures Painting Structures

(SSPC)" is also clearly defined as well known to one of ordinary skill in the art and hence Claims 62-66 are not indefinite.

REJECTIONS BASED ON 35 U.S.C. § 103(a)

The Examiner rejected all of the previously pending claims based on U.S. Patent No. 5,078,847 to Grosman et al., U.S. Patent No. 4,420,386 and 4,468,309 to White, U.S. Patent No. 3,329,601 to Mattox, and U.S. Patent No. 4,725,345 to Sakamoto et al. As will be illustrated below, several claim limitations found in the independent claims of the present invention are not taught, described, or suggested by any of the references. For example, independent Claim 1, as amended, recites the following limitation:

> **flowing a gas through the vacuum chamber at a rate to raise the pressure in the vacuum chamber to at or between 0.1 milliTorr and 4 milliTorr**

Nothing in Grosman et al., the White patents, Mattox, or Sakamoto suggest such a limitation as a means to control pressure and to assist with the generation of a plasma as defined in independent Claim 1, especially in combination with the other limitations of independent Claim 1. As such, the pending claims of Claims 1-128 are not rendered obvious by any of the asserted references, and Applicants respectfully request withdrawl of this rejection.

Similarly, dependent Claim 122, as ameneded, requires the following limitation:

> **flowing a gas through the vacuum chamber at a rate to raise the pressure in the vacuum chamber to at or between 20 milliTorr and 100 milliTorr**

Just as described above, none of the references teach, suggest or describe this limitation, especially in combination with all of the other limitations of Claim 122, as such, the rejection of the currently pending claims of Claims 122-128 should be withdrawn.

Applicants strongly assert that independent Claim 129, and its dependent Claim 132, as presently amended, contain claim limitations that are not found, taught, described, or suggested in any of the applied rèferences. For example, independent Claim 129 includes the following limitation:

> **reducing an initial pressure in the vacuum chamber to at or between 0.5 milliTorr and 1.5 milliTorr**

None of the references teach such a limitation. It is believed that these pressure ranges provide the significant advantage of the present invention by allowing for repeatable and reliable plasma plating of substrates with known and desired engineered surfaces. As such, the rejection of Claims 129 and 132 should be withdrawn.

CONCLUSION

For all the reasons mentioned herein, Applicants respectfully request reconsideration. Applicants submit that the Application is in condition for full allowance of all currently pending claims, and Applicants earnestly seek such full allowance. Should the Examiner have any questions, comments, or suggestions in furtherance of the prosecution of this Application, please contact the undersigned by telephone at 214.979.3027. Applicants, through their attorney, stand ready to conduct a telephone interview with the Examiner to review this Application if the Examiner believes that such an interview would assist in the advancement of this Application.

To the extent that any further fees are required during the pendency of this Application, including petition fees, the Commissioner is hereby authorized to charge payment of any additional fees, including, without limitation, any fees under 37 C.F.R. § 1.16 or 37 C.F.R. § 1.17, to Deposit Account No. 23-3189 of Worsham Forsythe Wooldridge LLP (please note that the law firm of Applicant's Attorneys has merged with Hunton & Williams, and, as such, the name on the deposit account has recently been requested to be renamed as "Hunton & Williams (Dallas)") and reference Attorney Docket No. TUEC.IP2005. In the event that any additional time is needed for this filing, or

any additional time in excess of that requested in a petition for an extension of time, please consider this a petition for an extension of time for any needed extension of time pursuant to 37 C.F.R. § 1.136 or any other section or provision of Title 37 of the Code of Federal Regulations. Applicants respectfully requests that the Commissioner grant any such petition and authorize the Commissioner to charge the Deposit Account referenced above. Please credit any overpayments to this same Deposit Account.

Respectfully submitted,

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1. **(Twice Amended)** A method for plasma plating comprising:

positioning a substrate within a vacuum chamber;

positioning a depositant in an evaporation source within the vacuum chamber;

reducing **[the]** **an initial** pressure in the vacuum chamber to **[a level]** at or below 4 milliTorr;

flowing a gas through **[introducing a gas into]** the vacuum chamber at a rate to raise the pressure in the vacuum chamber to **[a level]** at or between 0.1 milliTorr and 4 milliTorr;

applying a **negative** dc signal to the substrate at a voltage amplitude at or between 1 volt and 5000 volts;

applying a radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts; and

heating the depositant to a temperature at or above the melting point of the depositant **[to generate]**, **whereby** a plasma **is generated** in the vacuum chamber**, which includes a mixture of positively charged depositant ions and electrons, and the depositant ions are plated on a surface of the substrate**.

2. **(Amended)** The method of Claim 1, wherein reducing the **initial** pressure in the vacuum chamber to **[a level]** at or below 4 milliTorr includes reducing the pressure in the vacuum chamber to **[a level]** at or below 1.5 milliTorr, and wherein **flowing a gas through [introducing a gas into]** the vacuum chamber at a rate to raise the pressure in the vacuum chamber to **[a level]** at or between 0.1 milliTorr and 4 milliTorr includes **flowing the gas through [introducing the gas into]** the vacuum chamber at a rate to raise the pressure **in the vacuum chamber** to **[a level]** at or between 0.5 milliTorr and 1.5 milliTorr.

3. **(Amended)** The method of Claim 1, wherein applying the **negative** dc signal to the substrate at a voltage amplitude at or between 1 volt and 5000 volts includes applying a **negative** dc signal to the substrate at a voltage **[level] amplitude** at or between negative 500 volts and negative 750 volts.

4. **(Amended)** The method of Claim 1, wherein **[applying the radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts includes applying the radio frequency signal to the substrate at a] the** power level **is provid d** at or between 5 watts and 15 watts.

5. **(Amended)** The method of Claim 1, wherein **[applying the radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts includes applying the radio frequency signal to the substrate at a]** **the** power level **is** around 10 watts.

6. **(Cancel)** The method of Claim 1, wherein applying the dc signal to the substrate includes applying the dc voltage at a negative polarity, and the plasma includes positive depositant ions.

7. **(Amended)** The method of Claim 1, wherein reducing the **initial** pressure in the vacuum chamber to **[a level]** at or below 4 milliTorr includes reducing the **initial** pressure in the vacuum chamber to **[a level]** at or below 1.5 milliTorr, and **flowing the gas through [introducing the gas into]** the vacuum chamber at a rate to raise the pressure in the vacuum chamber to **[a level]** at or between 0.1 milliTorr and 4 milliTorr includes **flowing the gas through [introducing the gas into]** the vacuum chamber at a rate to raise the pressure to **[a level]** at or between 0.5 milliTorr and 1.5 milliTorr, wherein applying a **negative** dc signal to the substrate at a voltage amplitude at or between 1 volt and 5000 volts includes applying a **negative** dc signal to the substrate at a voltage **[level] amplitude** at or between negative 500 volts and negative 750 volts, and wherein **[applying the radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts includes applying the radio frequency signal to the substrate at a] the** power level **is provided** at or between 5 and 15 watts.

11. **(Amended)** The method of Claim 9, further comprising:

rotating the turntable at a **rotational** rate of revolutions per minute at or between 12 revolutions per minute and 15 revolutions per minute.

18. **(Cancel)** The method of Claim 8, wherein the platform includes a vertical surface.

19. **(Cancel)** The method of Claim 8, wherein the platform includes an inclined surface.

20. **(Cancel)** The method of Claim 8, wherein the platform includes a curved surface.

21. **(Cancel)** The method of Claim 8, wherein the platform includes a curvilinear surface.

22. **(Cancel)** The method of Claim 8, wherein the platform includes a helical surface.

23. **(Canc 1)** The method of Claim 8, wherein the platform is a support structure.

26. **(Cancel)** The method of Claim 8, wherein the platform includes a roller.

32. **(Twice Amended)** The method of Claim 1, further comprising:

positioning the evaporation source **[at a desired location]** relative to the substrate.

40. **(Twice Amended)** The method of Claim 1, further comprising:

positioning the evaporation source **[at a desired location]** relative to the substrate;

positioning a second depositant **[of the same type]** , **,which is made of the same material** as the depositant**,** in a second evaporation source within the vacuum chamber; and

positioning the second evaporation source **[at a desired location]** relative to the substrate.

48. **(Twice Amended)** The method of Claim 1, further comprising:

an array of substrates, and the substrate is provided as one of the array of substrates;

positioning the evaporation source **[at a desired position]** relative to outwardly facing surfaces of the array of substrates;

positioning a second depositant in a second evaporation source within the vacuum chamber; and

positioning the second evaporation source **[at a desired position]** relative to inwardly facing surfaces of the array of substrates.

49. **(Amended)** The method of 48, wherein the **[weight]** **total mass** of the second depositant is 20 to 80 percent less than the **[weight]** **total mass** of the depositant.

50. **(Amended)** The method of 49, wherein the **[weight]** **total mass** of the second depositant is 40 to 50 percent less than the **[weight]** **total mass** of the depositant.

51. **(Cancel)** The method of Claim 1, further comprising:

positioning the substrate relative to the evaporation source.

52. **(Twice Amended)** The method of Claim 1, further comprising:

positioning a second depositant in a second evaporation source within the vacuum chamber before reducing the pressure in the vacuum chamber to **[a level]** at or below 4 milliTorr; and

heating the second depositant to **[a temperature]** at or above the melting point of the second depositant **[to generate]**, **whereby** a second plasma **is generated** in the vacuum chamber, **which includes a mixture of positively charged second depositant ions and electrons, and the second depositant ions are plated on the surface of the substrate that was plated with the depositant ions** **[after the prior plasma has been generated]**.

54. **(Twice Amended)** The method of Claim **[51]** **52**, further comprising:

positioning a third depositant in a third evaporation source within the vacuum chamber before reducing the pressure in the vacuum chamber to **[a level]** at or below 4 milliTorr; and

heating the third depositant to a temperature at or above the melting point of the third depositant **[to generate]**, **whereby** a third plasma **is generated** in the vacuum chamber, **which includes a mixture of positively charged third depositant ions and electrons, and the third depositant ions are plated on the surface of the substrate that was plated with the second depositant ions** **[after the second plasma has been generated]**.

56. **(Amended)** The method of Claim 1, wherein the radio frequency signal is provided at a frequency **above one** **[in the]** kilohertz range.

57. **(Amended)** The method of Claim 1, wherein the radio frequency signal is provided at a frequency **above one** **[in the]** megahertz range.

63. **(Cancel)** The method of Claim 62, wherein the cleaning the substrate includes cleaning the substrate to meet a defined standard.

89. **(Cancel)** The method of Claim 1, wherein the gas is a noble gas.

102. **(Amended)** The method of Claim 1, wherein the gas is argon and the despositant is a metal **[allow]** **alloy** of silver/palladium, and the plasma includes argon ions and silver/palladium ions.

110. **(Cancel)** The method of Claim 1, wherein the evaporation source is a support structure.

112. **(Twice Amended)** The method of Claim 111, wherein heating the depositant includes incremental staging of the current to the evaporation source to achieve **[a more]** **an** even heat distribution in the depositant.

114. **(Amended)** The method of Claim 113, wherein the amplitude of the alternating current is controllably increased such that the depositant is **[more]** uniformly heated and melted.

122. **(Amended)** The method of Claim 1, further comprising:

performing backsputtering before heating the depositant that includes:

reducing the pressure in the vacuum chamber to **[a level]** at or below 100 milliTorr;

flowing a gas through **[introducing a gas into]** the vacuum chamber at a rate to raise the pressure in the vacuum chamber at or between 20 milliTorr and 100 milliTorr;

applying a dc signal to the substrate at a voltage amplitude at or between 1 volt and 4000 volts; and

applying a radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts.

123. **(Amended)** The method of Claim 122, wherein reducing the pressure in the vacuum chamber to **[a level]** at or below 100 milliTorr includes reducing the pressure in the vacuum chamber to **[a level]** at or below 50 milliTorr, and wherein **flowing the gas through [introducing the gas into]** the vacuum chamber at a rate to raise the pressure in the vacuum chamber at or between 20 milliTorr and 100 milliTorr includes **flowing the gas through [introducing the gas into]** the vacuum chamber at a rate to raise the pressure at or between 20 milliTorr and 50 milliTorr.

125. **(Amended)** The method of Claim 122, wherein **[applying the radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts includes applying the radio frequency signal to the substrate at a]** the power level **is provided** at or between 5 and 15 watts.

129. **(Twice Amended)** A method for plasma plating comprising:

positioning a substrate within a vacuum chamber;

positioning a depositant in the vacuum chamber;

reducing **[the]** **an initial** pressure in the vacuum chamber to **[a level]** at or between **[0.1]** **0.5** milliTorr and **[4]** **1.5** milliTorr;

applying a **negative** dc signal to the substrate at a voltage amplitude at or between **[1]** **500** volt**s** and **[5000]** **750** volts;

applying a radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts; and

heating the depositant to a temperature at or above the melting point of the depositant **[to generate]**, **whereby** a plasma **is generated** in the vacuum chamber**, which includes a mixture of positively charged depositant ions and electrons, and the depositant ions are plated on a surface of the substrate**.

130. **(Cancel)** The method of Claim 129, wherein applying the dc signal to the substrate at a voltage amplitude at or between 1 volt and 5000 volts includes applying a dc signal to the substrate at a voltage amplitude at or between 500 volts and 750 volts.

131. **(Cancel)** The method of Claim 129, wherein applying the dc signal to the substrate includes applying the dc voltage at a negative polarity, and the plasma includes positive depositant ions.

132. **(Amended)** The method of Claim 129, wherein **[applying the radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts includes applying the radio frequency signal to the substrate at a]** **the** power level **is provided** at or between 5 and 15 watts.

133. **(Cancel)** The method of Claim 129, wherein applying a dc signal to the substrate at a voltage amplitude at or between 1 volt and 5000 volts includes applying a dc signal to the substrate at a voltage amplitude at or between 500 volts and 750 volts with a negative polarity, and wherein **[applying the radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts includes applying the radio frequency signal to the substrate at a]** **the** power level **is provided** at or between 5 and 15 watts.